

17506

15116

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any **THREE** of the following :

12

- (a) List conventional and non-conventional energy sources. (any four)
- (b) Define the following terms :
 - (i) Illuminance
 - (ii) Luminous flux
 - (iii) Illumination
 - (iv) Luminous efficacy
- (c) List energy conservation techniques in electrical motors.
- (d) State advantages of Energy Efficient motors as compared to conventional motors.

(B) Attempt any **ONE** of the following :

06

- (a) Describe the effect of following on Induction Motor :
 - (i) Voltage Unbalance
 - (ii) Harmonic Distortion
- (b) A 10 HP motor is used for 20 hrs per week to pump water. A new motor has to be replaced to save 5 kWh of energy during each hour. If the cost of new motor is ₹ 45,000, calculate pay back period with electricity cost of ₹ 4.20 per kWh.

P.T.O.

2. Attempt any FOUR of the following : 16

- (a) Describe how by replacing existing lamp sources with energy efficient lamp sources will improve efficiency.
- (b) State proper maintenance program for energy conservation in lighting system.
- (c) Describe constructional features of dry type transformer to improve efficiency.
- (d) Classify commercial losses in Transmission & Distribution system.
- (e) “Use of control gears and sensors helps in energy conservation in lighting system.” – Justify.
- (f) A factory has an induction motor of 40 kW running with full load efficiency of 80%. It is supposed to be replaced by another motor having efficiency of 85%. What will be the saving in energy if motor work for 10,000 Hrs. per year and cost of energy is ₹ 5.00 per kWh ?

3. Attempt any FOUR of the following : 16

- (a) Draw power flow diagram of induction motor and describe methods of improving efficiency by good power quality.
- (b) List the advantages and disadvantages of amorphous core in transformer.
- (c) Explain following energy conservation methods of electrical motor :
 - (i) Matching motor rating with required load.
 - (ii) Minimizing idle & redundant running of load.
- (d) Describe energy conservation techniques for transformer related to change in material and design.
- (e) How power factor and load factor contributes technical losses in T & D system ?

4. (A) Attempt any THREE of the following : 12

- (a) Describe Maximum Demand Tariff and Power Factor Tariff.
- (b) Describe the need of cogeneration.
- (c) If minimum demand of consumer is 500 kW, p.f. 0.8 lag and load factor 70%. The tariff applied is ₹ 80/ kVA of maximum demand and 20 paise per kWh consumed. Calculate annual bill of consumer.
- (d) Describe how load factor can contribute in reducing energy bill.

(B) Attempt any ONE of the following : **06**

- (a) Describe methods of reducing technical losses in transmission & distribution system.
- (b) Describe features of (i) Block rate Tariff (ii) Two part Tariff.

5. Attempt any FOUR of the following : **16**

- (a) Describe the methods of reducing commercial losses in distribution system.
- (b) Enlist various energy conservation equipments which can be implemented in lighting system and electric motors.
- (c) Describe combined Cycle Topping Cycle scheme of cogeneration with neat diagram.
- (d) State the benefits of variable frequency drives.
- (e) State advantages of soft starters over conventional starters.
- (f) What is occupancy sensor ? How it can be used as energy conservation equipments in lighting system ?

6. Attempt any FOUR of the following : **16**

- (a) What is ABC analysis ? State its advantages for energy audit.
 - (b) Describe detailed energy audit procedure to be carried out for an organisation.
 - (c) State the factors to be considered for selection of cogeneration techniques.
 - (d) Distinguish between open cycle and close cycle gas turbine cogeneration system.
 - (e) Develop a questionnaire for energy audit of a multispeciality hospital.
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